

**I CLAIM:**

1 1. A flex circuit assembly for use in a head stack assembly, the flex circuit assembly  
2 comprising:  
3 a flex circuit base film;  
4 an integrated circuit device disposed adjacent the flex circuit base film and including  
5 a solder bump connection;  
6 an electrically conductive trace disposed upon the flex circuit base film, the trace  
7 including a contact pad, the contact pad electrically connected to the solder bump  
8 connection;  
9 an underfill portion disposed between the flex circuit base film and the integrated  
10 circuit device for attaching the integrated circuit device to the flex circuit base film, the  
11 underfill portion being formed of an underfill material; and  
12 a glob top portion disposed upon the underfill portion and the flex circuit base film  
13 for sealing the electrically conductive trace, the glob top portion being formed of a glob top  
14 material, the glob top material being different than the underfill material.

- 1    2.     The flex circuit assembly of Claim 1 wherein the underfill material is a no-flow  
2    encapsulant.
- 1    3.     The flex circuit assembly of Claim 1 wherein the underfill material is a capillary flow  
2    encapsulant.
- 1    4.     The flex circuit assembly of Claim 1 further includes a flex circuit cover film disposed  
2    upon the flex circuit base film, the flex circuit cover film includes an opening, the integrated  
3    circuit device and the electrically conductive trace are disposed within the opening.
- 1    5.     The flex circuit assembly of Claim 4 wherein the underfill portion and the glob top portion  
2    are disposed within the opening.
- 1    6.     The flex circuit assembly of Claim 1 wherein the underfill portion has a coefficient of  
2    thermal expansion between coefficients of thermal expansion of the integrated circuit device and  
3    the flex circuit base film.
- 1    7.     The flex circuit assembly of Claim 1 wherein the underfill portion has a coefficient of  
2    thermal expansion greater than a coefficient of thermal expansion of the glob top portion.

- 1     8.     A head stack assembly for use in a disk drive, the head stack assembly comprising:
- 2             a rotary actuator; and
- 3             a flex circuit assembly attached to the rotary actuator, the flex circuit assembly
- 4     including:
- 5             a flex circuit base film;
- 6             an integrated circuit device disposed adjacent the flex circuit base film and
- 7     including a solder bump connection;
- 8             an electrically conductive trace disposed upon the flex circuit base film, the
- 9     trace including a contact pad, the contact pad electrically connected to the solder
- 10    bump connection;
- 11            an underfill portion disposed between the flex circuit base film and the
- 12    integrated circuit device for attaching the integrated circuit device to the flex circuit
- 13    base film, the underfill portion being formed of an underfill material; and
- 14            a glob top portion disposed upon the underfill portion and the flex circuit
- 15    base film for sealing the electrically conductive trace, the glob top portion being
- 16    formed of a glob top material, the glob top material being different than the underfill
- 17    material.

- 1 9. The head stack assembly of Claim 8 wherein the underfill material is a no-flow encapsulant.
- 1 10. The head stack assembly of Claim 8 wherein the underfill material is a capillary flow  
2 encapsulant.
- 1 11. The head stack assembly of Claim 8 further includes a flex circuit cover film disposed  
2 upon the flex circuit base film, the flex circuit cover film includes an opening, the integrated  
3 circuit device and the electrically conductive trace are disposed within the opening.
- 1 12. The head stack assembly of Claim 11 wherein the underfill portion and the glob top portion  
2 are disposed within the opening.
- 1 13. The head stack assembly of Claim 8 wherein the underfill portion has a coefficient of  
2 thermal expansion between coefficients of thermal expansion of the integrated circuit device and  
3 the flex circuit base film.
- 1 14. The head stack assembly of Claim 8 wherein the underfill portion has a coefficient of  
2 thermal expansion greater than a coefficient of thermal expansion of the glob top portion.

- 1     15.     A disk drive comprising:
- 2                     a disk drive base; and
- 3                     a head stack assembly rotatably coupled to the disk drive base, the head stack
- 4     assembly including:
- 5                     a rotary actuator; and
- 6                     a flex circuit assembly attached to the rotary actuator, the flex circuit
- 7     assembly including:
- 8                     a flex circuit base film;
- 9                     an integrated circuit device disposed adjacent the flex circuit base
- 10     film and including a solder bump connection;
- 11                     an electrically conductive trace disposed upon the flex circuit base
- 12     film, the trace including a contact pad, the contact pad electrically connected
- 13     to the solder bump connection;
- 14                     an underfill portion disposed between the flex circuit base film and
- 15     the integrated circuit device for attaching the integrated circuit device to the
- 16     flex circuit base film, the underfill portion being formed of an underfill
- 17     material; and
- 18                     a glob top portion disposed upon the underfill portion and the flex
- 19     circuit base film for sealing the electrically conductive trace, the glob top
- 20     portion being formed of a glob top material, the glob top material being
- 21     different than the underfill material.

- 1 16. The disk drive of Claim 15 wherein the underfill material is a no-flow encapsulant.
- 1 17. The disk drive of Claim 15 wherein the underfill material is a capillary flow encapsulant.
- 1 18. The disk drive of Claim 15 further includes a flex circuit cover film disposed upon the  
2 flex circuit base film, the flex circuit cover film includes an opening, the integrated circuit device  
3 and the electrically conductive trace are disposed within the opening.
- 1 19. The disk drive of Claim 18 wherein the underfill portion and the glob top portion are  
2 disposed within the opening.
- 1 20. The disk drive of Claim 15 wherein the underfill portion has a coefficient of thermal  
2 expansion between coefficients of thermal expansion of the integrated circuit device and the flex  
3 circuit base film.
- 1 21. The disk drive of Claim 15 wherein the underfill portion has a coefficient of thermal  
2 expansion greater than a coefficient of thermal expansion of the glob top portion.